

APPLICATION  
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TITLE: CROSS-ENTERPRISE GAMING SERVER

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## CROSS-ENTERPRISE GAMING SERVER

This application claims the benefit of U.S. Provisional Application No. 60/413,201, filed on September 23, 2002, which is hereby incorporated by reference in its entirety.

### BACKGROUND

5 This present specification relates to computer-implemented gaming.

Computer implemented gaming systems can include various games of chance. Examples of these games include and are not limited to slots, blackjack, poker, and roulette.

10 In general, an instance of a game of chance, referred to in this specification as a round, includes a start and an end. The start occurs when one or more participating players place wagers. The end occurs when an outcome of the instance of the game is or can be determined in accordance with the rules of the game. An outcome of the instance of the game, or simply an outcome, is usually defined by who wins among the players participating in the proposition, what each winning player wins, who loses among the players participating in the proposition, what each losing players loses, who ties among the players participating in the proposition (if a tie is permitted by the rules of the game), and any combination of the  
15 aforementioned. Alternatively an outcome can be otherwise defined.

An outcome generally depends, at least in part, on an outcome of a random outcome generator ("ROG"). An outcome of a random outcome generator will be referred to in this specification as an ROG result. Examples of random outcome generators include and are not  
20 limited to dice, cards, a roulette wheel, a computer program product driven by a random or pseudo-random number generator, and a sporting event (for example, a horse race). An outcome can depend on one ROG result. Roulette, for example, is a game of chance in which an outcome can depend on a single ROG result, one spin of the roulette wheel. Alternatively, an outcome can depend on multiple ROG results. Blackjack, for example, is a  
25 game of chance in which an outcome can depend on multiple ROG results. A game of blackjack involves dealing multiple cards from one or more decks of cards.

A wager can represent an agreement between a player and an entity offering the game of chance. Wagers are usually but need not be made on a round-by-round basis. The entity offering the agreement can be a player. The agreement can specify that the player forfeits a  
30 wager if the player loses in exchange for an opportunity to win a multiplier, which can be any

number, of the wager if the player wins. The outcome is usually based on whether the player wins, loses, or ties.

The wager required for participation in a proposition is usually, but need not be, of some particular denomination of money or points. Games of chance implemented as slot machines, for example, can receive denominations of nickels, quarters, dollars, and so forth. Here, as with other games of chance, a player may increase the wager placed by adding to the wager in an appropriate denomination. Doing so can enhance the player's chances of winning. In the Blazing Sevens slot game, for example, matching "7" symbols pays an award only if two or more coins have been wagered. Increasing a wager placed can increase the payout if the player wins.

Computerized gaming systems can take many forms including stand-alone games, for example, those in a casino, and gaming systems run through a personal computer. Computerized gaming systems can be stand alone or be part of a network, such as in Internet gaming. In gaming, there are often multitudes of ways in which a player can win. As with how a player wins, what a player wins (the prize) can also vary greatly.

One type of prize is a progressive award, which is a payout that can be a portion or all of a progressive jackpot (hereinafter, "progressive"). Typically, the player is required to make a certain sized wager in order to qualify for the progressive award. For example, in most progressive slot games, i.e., slot games that includes a progressive, the player can only win the progressive award if the maximum possible wager is placed. For certain table games with progressive awards, such as Caribbean Stud Poker, the player is only eligible if he places a side bet wager of a specified amount (typically \$1, £1, or €1), depending on the currency being used. In a gaming that includes a progressive (i.e., a progressive game), the maximum amount a player can win can increase incrementally with each qualifying wager until the progressive is won. Thus, as more qualifying wagers are placed, the progressive becomes larger. Examples of progressive games include and are not limited to certain slot games and state lottery systems.

While a specific gaming device, for example, a slot machine or video poker machine, may have a progressive associated with just that machine, it is more common for multiple machines to share a progressive jackpot. These machines can be linked within a single bank, or linked between machines within a given casino or linked between machines across two or

more casinos. Games linked together sharing the same progressive have conventionally had the same progressive payout parameters.

Progressive payout parameters include:

- Odds of getting each progressive award winning outcome with one try.
- Wager requirements to qualify for each progressive award, implicitly or explicitly expressing actual money (e.g., a player must wager 2 coins or 2 credits to be eligible to win the progressive where each coin or credit is \$1).
- Percentage of wager to be applied to the progressive jackpot. Jurisdictional regulations usually require that contributions from wagers only be applied to the jackpot if the wager is a qualifying one.
- Percentage of progressive jackpot to be awarded. The percentage is usually 100%; however in some games, for example, Caribbean Stud Poker, there can be award outcomes which pay only a percent of the jackpot, for example, 10% of the jackpot for a non-Royal Straight Flush.

A set of progressive payout parameters can include one or more of the above listed parameters. Furthermore, a set of progressive parameters can include other parameters.

A network of two or more games with identical progressive payout parameters sharing one or more progressive jackpots is referred to in this specification as a homogenous progressive network. In general, conventional networked progressives are homogenous progressive networks, mostly due to regulatory requirements following the principle that a player's odds of getting a progressive award should be the same no matter which game on the network they play. More specifically, the requirements is that a player's odds of winning a progressive award should scale directly with the amount of the player's wager to be applied to the progressive. For online casino games in unregulated jurisdiction, this principle is likely still followed in order to be fair to the players.

For land-based casinos, each game machine typically has its own ROG therefore each machine is capable of locally generating the progressive award winning outcome which would then be reported to the homogenous progressive network controller. For secured online casinos, the ROG is usually provided as a centralized service in a client-server configuration.

## SUMMARY

The present specification provides methods and apparatus, including computer program products, for providing a progressive for heterogeneous gaming systems where multiple games share a same progressive jackpot but do not have identical progressive payout parameters.

In general, in one aspect, a method for providing a progressive jackpot includes receiving progressive payout information of a game system that includes a progressive jackpot. The information specifies a wager amount needed to be eligible to win the progressive jackpot, odds of winning the progressive jackpot, and an amount of a wager that is contributed to the progressive jackpot. The method includes changing one of: (i) the wager amount needed to be eligible to win the progressive jackpot; (ii) the odds of winning the progressive jackpot; and (iii) the amount of a wager that is contributed to the progressive jackpot so that the product of: (i) the wager amount needed to be eligible to win the progressive jackpot; (ii) the odds of winning the progressive jackpot; (iii) and the amount of a wager that is contributed to the progressive jackpot is equal to a number.

In one implementation, the game system is a first game system. The progressive jackpot is a first progressive jackpot. The number is the product of; (i) a wager amount needed to be eligible to win a second progressive jackpot of a second game system; (ii) odds of winning the second progressive jackpot; (iii) and an amount of a wager that is contributed to the second progressive jackpot. The method further includes combining the first and the second progressive jackpots.

In general, in one aspect, the invention provide a computer program product, tangibly stored on machine readable medium, for providing a progressive jackpot. The product includes instructions to cause a processor to receive progressive payout information of a game system that includes a progressive jackpot. The information specifies a wager amount needed to be eligible to win the progressive jackpot, odds of winning the progressive jackpot, and an amount of a wager that is contributed to the progressive jackpot. The product includes instructions to change one of the wager amount needed to be eligible to win the progressive jackpot, the odds of winning the progressive jackpot, and the amount of a wager that is contributed to the progressive jackpot so that the product of the wager amount needed

to be eligible to win the progressive jackpot, the odds of winning the progressive jackpot, and the amount of a wager that is contributed to the progressive jackpot is equal to a number.

In general, in another aspect, a system for managing a progressive game includes a progressive management device including an interface. The system includes a progressive engine for maintaining a progressive. The progressive management device is coupled by interface to a first gaming system and a second gaming system. The first gaming system includes a first set of progressive payout parameters and the second gaming system includes a second set of progressive payout parameters that is different from the first set of progressive payout parameters.

In general, in another aspect, the invention provides a method for including systems having different progressive payout parameters into the same progressive. The method includes initiating a progressive; receiving a request from a first gaming system to participate in a progressive; receiving a request from a second gaming system to participate in a progressive, the first gaming system having a first set of progressive payout parameters and the second gaming system having a second set of progressive payout parameters that is different from the first set of progressive payout parameters; and calculating a percentage of wager to be applied by each gaming system to the progressive, the calculation being based on the first and second sets of progressive payout parameters.

In general, in another aspect, a system for managing a progressive game includes a progressive management device coupled to a gaming server. The gaming server includes two or more gaming systems. One gaming system includes a first set of progressive payout parameters and a second gaming system includes a second set of progressive payout parameters that is different from the first progressive payout parameters.

In general, in another aspect, the invention provides a method for including gaming systems having different currency types to a progressive. The method includes: receiving input from one or more gaming servers seeking participation in a progressive jackpot; analyzing characteristics of each gaming system, wherein the characteristics include the currency type of the gaming system; converting the currency type of each gaming system into a standard currency; and including one or more gaming systems in the progressive jackpot by varying the percentage of the gaming system's wager applied to the progressive jackpot.

In general, in another aspect, the invention provides a method for validating progressive payout parameters in gaming systems participating in a progressive. The method includes: receiving requests from one or more gaming servers including one or more gaming systems to participate in a progressive, wherein the gaming systems include a first gaming system having a first set of progressive payout parameters and a second gaming system having a second set of progressive payout parameters that is different from the first progressive payout parameters; analyzing characteristics of each gaming system, the characteristics including the progressive payout parameters; validating the progressive payout parameters of the gaming systems, including verifying that game odds and a payoff are consistent and within predetermined criteria; and including validated gaming systems in the progressive.

In general, in another aspect, the invention provides a system for including gaming systems from different enterprises and having a same progressive payout parameters to a progressive. The system includes: a progressive management server coupled through a network to two or more gaming servers, the gaming servers operated by two or more enterprises; and the gaming servers operating one or more gaming systems having same progressive payout parameters.

In general, in another aspect, the invention provides a method for determining a progressive outcome. The method includes: receiving data at a progressive management device concerning a wager placed by a user of a participating gaming system; determining a percentage of the wager to be applied to a progressive based on progressive payout parameters analysis, the progressive payout parameters including game odds and wager amount; incrementing the progressive; executing a random number generator calculation using the game odds from the gaming system progressive payout parameters; and transmitting results of the random number generator calculation to a participating gaming system.

The methods and apparatus described in the present specification can be implemented to realize one or more of the following advantages. A system in accordance with the invention can allow for centralized management of progressive games, especially games using different progressive payout parameters as well as games across different enterprises. Further, by supporting games with multiple progressive payout parameters, users attracted to

different game formats will be able to participate in a same progressive. By allowing for a greater number of games to participate in the same progressive jackpot, whether due to different game types having different progressive payout parameter or due to the aggregation of games from two or more gaming systems, the progressive can increase proportionally faster.

The system allows for multi-national progressive gaming and can convert currency types in real-time. The multi-national aspect can be achieved while maintaining the fairness principle that one's chance of winning a progressive award should directly scale with the wager amount to be applied to the progressive jackpot.

The system also allows for the aggregation of games from different gaming software providers, including a scenario where it is desirable to be able to provide a demonstrably secure and trusted system without having to trust, reveal or audit a third party's game system source code. When aggregating games supported by game systems of one's own design or by trusted third party providers, and operated by trusted entities, each game system can use its own ROG to determine outcomes for each game played. In the case of a reported progressive jackpot win, the outcome can be verified and validated by examining operations logs and possibly by also verifying that the game system software has not been modified.

However, it is also possible to support games implemented using 3<sup>rd</sup> party software whose source code and/or whose operation cannot be necessarily trusted or verified. In this case, the gaming network provider can also provide ROG facilities which the third party software would use. In the case of a reported progressive jackpot win, the ROG log can be examined, along with the game model documentation provided when a game is to be added to the network to verify and validate the win. The game model documentation describes how ROG results map to game outcomes, making win verification simple. For example, if the game model documentation indicates that a progressive paying outcome occurs for the ROG outcome  $\{x=1, y=1, z=1\}$  where values for x, y and z can each be between 1 and 256, then it is simple to determine whether or not the ROG produced and logged a result of  $\{x=1, y=1, z=1\}$  for the game in the game system which subsequently reported a winning jackpot claim.



The ROG to be provided for use for third party software can be implemented as a service which runs on hardware controlled and operated by the progressive network operator or can be provided on secure, tamper-proof hardware which the third party operates.

The details of one or more implementations of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

## DESCRIPTION OF DRAWINGS

FIG. 1 illustrates a system for managing a progressive.

FIG. 2 illustrates an implementation of a progressive management device.

FIG. 3 is a flowchart describing a method for managing a progressive.

FIG. 4 is a flowchart describing a method for including gaming systems having games with different progressive payout parameters into a progressive.

FIG. 5 illustrates an alternative system for managing a progressive.

FIG. 6 illustrates a system for including gaming systems from different enterprises in a progressive.

Like reference symbols in the various drawings indicate like elements.

## DETAILED DESCRIPTION

FIG. 1 shows a system 50 for managing a progressive. System 50 can include a progressive management device 100. Progressive management device 100 can be coupled to a network 160 through, for example, an optional gateway 150. Network 160 can be coupled to gaming servers 170. Gaming servers 170 can include one or more gaming systems 180 having two or more games with different progressive payout parameters. Further, each gaming server 170 can be coupled to one or more user interfaces 190. The components of system 50 can be connected by various networks, links, or data buses so that the components of system 50 can exchange information and work in conjunction with one another and with devices external to system 50.

In general, progressive management device 100 can provide administrative and management functions for a progressive. Administrative functions can include, for example, generating reports on a periodic basis for both progressive managers and casino managers.

These reports can show: the number of transactions, for example, wagers, made over a particular interval for a progressive; an amount contributed to a progressive; and a source casino for the wagers. In one implementation, casinos receive reports monthly as part of regular billing for use of the progressive system.

5 With respect to the management functions, progressive management device 100 can, for example, initiate and configure a progressive. Progressive management device 100 can include the hardware and software for performing functions necessary to managing a progressive. Management functions can include analyzing progressive payout parameters for validation. Progressive management device 100 can, for example, verify that progressive  
10 payout parameters for a particular gaming system complies with regulations. Management functions can further include: calculating and updating a value of a progressive in real-time; collecting financial metrics from clients for contribution to a progressive; and interrupting a progressive for reasons including a potential winner, fraud detection, or other criteria.

As shown in FIG. 2, progressive management device 100 can include an interface  
15 component 105 for interacting with external devices, a communication component 110, a registration component 115, an analysis engine component 120 for examining gaming systems and progressive payout parameters, an integrator component 135 for integrating progressive games having different progressive payout parameters in a single progressive, and a progressive engine component 130 for maintaining the progressive total. Progressive  
20 management device 100 can also include one or more databases, for example, database 145, for storing and retrieving data. The data can include metrics regarding the progressive jackpot, data on the different progressive payout parameters of gaming systems, system usage, performance, as well as other data. The one or more databases can also include, for example, encryption keys, passwords, account numbers and money transfer details. The  
25 method by which progressive management device 100 configures the progressive to accommodate game systems having different progressive payout parameters is discussed in detail below with respect to FIG. 4.

Communication component 110 can transmit information to and receive information from gateway 150 (FIG. 1). Communication component 110 is also capable of performing  
30 the same functions as gateway 150 when gateway 150 is not present in the system.

Communications can include receiving information from gaming servers regarding requests

to have gaming systems join the progressive and receiving information from gaming servers regarding user wagers and the occurrence of a progressive winning outcome. Additionally, communication component 110 can communicate to gaming servers by providing updated information on the status of a progressive. The status includes the current amount of the progressive and can be updated periodically or in real-time. Progressive updates allow users to always know the status of the progressive through, for example, user interface 190 (FIG. 1). Communication component 110 can include communication devices configured for information exchange between computing systems.

Progressive management device 100 can function in locations with limited information technology infrastructure. For example, available bandwidth may be small and redundancy may be limited. As such, in one implementation, communication component 110 includes error handling, message queuing, system redundancy, and secure 128-bit encryption.

In one implementation, progressive management device 100 communicates with external devices, either directly or through gateway 150, to receive real-time currency exchange rates for conversion of one currency type to another. Receipt of real-time currency exchange rates can facilitate the inclusion of gaming systems having different currency types into a progressive. Progressive management device 100 can, for example, use currency converter 125 to convert different currencies used in different gaming systems into a standard currency type used by a progressive.

The exchange of currency and wager information emphasizes the need for secure communications between progressive management device 100 and all external devices. Progressive management device 100 can distribute information to gaming servers 170 based on permissions and trusted communications. Further, a secure protocol can be used for communications between progressive management device 100 and gaming servers 170. Other implementations can require that gaming servers 170 (FIG. 1) be time synchronized with progressive management device 100.

In one implementation, progressive management device 100 is a computer server application executed on a server computer coupled to a network. Progressive management device 100 can be based on a Web services model in which a centralized progressive management device performs progressive management functions for more than one gaming server. In this case, progressive management device 100 can perform progressive

management functions for multiple gaming systems operating in one or more jurisdictions. Alternatively, the progressive management device 100 can be embodied within a computer coupled to a network server or as a freestanding device within a computer network. Progressive management device 100 can communicate and interact with trusted gaming systems 180 through a secure protocol.

As indicated above, gateway 150 is an optional component for facilitating communication between progressive management device 100 and gaming server 170 through network 160 as well as other external communications such as required by the optional currency device. Gateway 150 can be implemented in a variety of ways including as a programmatic component or as an Application Program Interface (API) between system components. Communication functions can include receiving wager information from gaming server 170 and transmitting updated progressive information to gaming server 170.

In one implementation, progressive management device 100 and gaming server 170 exchange messages and data using gateway 150 through a mechanism such as a messaging queue. These messages can include proxies for progressive wagers placed by users through user interface 190. Additionally, communication can be performed securely through a cryptographic protocol or similar encryption mechanism. As stated above, all of the communication functions can be alternatively performed by communication component 110, of progressive management device 100, thus eliminating the need for gateway 150 in system 50.

Network 160 represents various media through which data can be transmitted between different computers and devices. One example of a network is the Internet, which is a global network connecting millions of computers allowing for the exchange of data. Other possible networks include a local area network and multiple local area networks combined to form a wide area network.

Gaming server 170 can be a device that manages one or more gaming systems 180. Gaming server 170 can, either directly or through connections with other devices, communicate with both user interfaces 190 and network 160. One example of gaming server 170 is an online casino management server. In an online casino, many different gaming systems are available to a user. However, in one implementation, the gaming systems are computer programs that are all managed by one or more gaming servers. The

gaming server runs the gaming system programs and transmits data to, and receives data from, the end user through a user interface.

Gaming system 180 can be the actual game being played by the user. In an online casino environment, gaming systems include each different type of game that can be played by a user including slot and card games. In a land-based casino, gaming systems include many types of slot games as well as video games such as video poker. There are many different types of gaming systems. For example, in slots there are many different themes, symbols (such as "Cherries", "7s" and "Bars"), wager values, odds, and payout possibilities for each type of game. The game odds represent the probability of a specific outcome such as the probability of drawing a "full house" in poker. Payout possibilities often can vary depending on the level of wager. Many progressive slot games require a threshold wager be placed by the user in order to be eligible for the progressive. For example, in a slot game having three reels, attaining three "sevens" in a row on a payline can entitle to user to the jackpot if a qualifying wager was placed. Thus in a slot game that allows a user to play on one or two coins, a one coin wager entitles the user to a static award upon hitting the jackpot winning outcome while a two coin wager can entitle the user to the progressive.

A system can be implemented where a percentage of all wagers is included in the progressive. In this situation, regulations generally require that a player be eligible to win a progressive regardless of wager amount as long as some portion of that wager is being included in the progressive.

User interface 190 represents a device through which a user can provide input and receive information about a specific gaming system. For example, in an online casino gaming environment, the user interface is generally a computer screen display. The display includes graphics and text describing the gaming system and allowing for various user inputs. The precise display and characteristics depend upon the pay model as well as the progressive payout parameters for that particular gaming system 180. A pay model describes the possible game awards, what outcomes will generate those awards, what wager requirements are needed to be eligible to win those awards and the probability of occurrence for each award. The full paymodel, therefore, also include the progressive payout parameters.

In a slot game, for example, the display can include the wager amount, the amount of credits available to wager, the amount of the progressive, other payout possibilities, and a

display of the game outcome such as a computer generated simulation of the slot reels displaying various game characters. The user can input, using an input device connected to the computer system, for example, a mouse or keyboard, changes to the wager amount as well as adding to their credit total or cashing out of the game.

5 In a land-based casino, the user interface display is often presented as part of a freestanding slot machine or video poker device. As with the online casino version, the display typically includes information on the wager amount, the amount of credits available to wager, the amount of the progressive, other payout possibilities, and a display of the game outcome. User input, by contrast, is often performed by physical means such as inserting  
10 coins, pressing buttons, touching a touch screen or pulling levers. Regardless of the input method, the invention is equally applicable to computer controlled games in both online and land-based casino environments.

In one implementation, the user interface component for the progressive is visible to the user through user interface 190, but it is not part of the gaming system itself. The user  
15 interface component functions only to communicate messages or data to and from the user regarding the current progressive amount. The interface component can take the form of, for example, a simple text field component that displays an approximation of the currently accumulating progressive. An approximation can be necessary in order to ensure that the progressive amount displayed does not exceed the actual progressive amount. In another  
20 implementation, the progressive amounts are visible outside of a participating game. For example, a user accessing an online casino can view the amount of a progressive prior to participating in the game. In one implementation, a text field component can appear as an incrementing number on user interface 190. A http socket can be connected to gateway 150 and query progressive management device 100 for the progressive amount. Another  
25 implementation can comprise a direct connection between the user interface component 190 and progressive management device 100 through a protocol such as SOAP.

In one implementation, progressive management device 100 transmits updated progressive data to users periodically through user interface 190. The updated progressive information provides an estimate of the progressive total. Alternatively, in another  
30 implementation, the update is provided in real time. For example, the updated estimated

progressive can be transmitted to the user every ten seconds or less while the user is playing a gaming system 180 participating in a progressive.

All components in this generalized system are accessible through published API's or other such programmatic interfaces, protocols, or technologies. As such, individual components can be implemented by third party vendors and still participate in a progressive if required compatibility and other requirements are met. For example, an online casino can implement a proprietary user interface 190 for use within the progressive system. Consequently, different gaming systems and different casino gaming servers can easily connect to progressive management device 100 and participate in a progressive.

Game players are the users who interact with the gaming systems 180 and, ultimately, progressive management device 100 through user interface 190. Players may interact with a gaming system directly from a land-based casino or online through their own home computer. Casino operators are usually users who manage and proffer gaming, which can include on-line gaming, stand-alone gaming, or both. The casino operators may choose which of their gaming systems to submit for participation in a progressive. Additionally, casino operators manage and monitor gaming system performance and pay out non-progressive winnings. Progressive administrators are usually users who configure and monitor progressive management devices, for example, the described progressive management device 100. Progressive administrators administrate permissions, reconcile discrepancies, and monitor progressive management device performance. Finally, regulators are third parties that represent a governing body of a jurisdiction (for example, the Isle of Man and Alderney) that regulates a progressive management device and/or participating gaming servers and systems. Regulators ensure that gaming performed in their jurisdiction conforms to established statutes and regulations.

A player wishing to participate in an online progressive usually first accesses an online casino including progressive games through a user interface 190, for example, a personal computer. Once accessing the online casino, the player can select from a menu of available gaming systems, including those participating in a progressive. If more than one progressive is available, the player can see the current progressive amount for each progressive before selecting a particular gaming system. After accessing a gaming system, the player is presented with information about the game including how to play, game rules,

wager information, progressive information, and pay tables showing, for example, win lines for a slot game. The pay table can display a theoretical expected return required for the jurisdiction in which the gaming system is based. For example, in Alderney, the theoretical expected return is equal to the sum of a base return, startup return, and an increment rate of the progressive.

When the player places a wager through user interface 190 and initiates a game, the outcome of that game can be determined by a computer. Outcome determination can be performed by gaming server 170 through execution of the software of gaming system 180. Alternatively, gaming system 180 can include all the necessary components to determine game outcomes. Generally, determination of game outcomes are based on one or more ROGs, for example, a pseudo-random number generator or a random number generator, as well as programming to translate the generated number or numbers into game characters. In one implementation, progressive management device 100 includes a game outcome services component 140 that allows progressive management device 100 to take over the outcome determination functions for the gaming systems participating in the progressive. In this implementation, progressive management device 100 manages all of the gaming systems participating in a progressive as well as the progressive itself. The game outcome services component 140 includes a random number generator that is seeded prior to game play. Seeding of the ROG, usually is completely random such that the seeded ROG cannot be reconstructed or based on a easily reproducible events, and can be performed in concert with officials from participating casinos. Once seeded, the ROG can be locked down to prevent tampering. ROG results can subsequently be digitally signed or verified. In a further implementation, a hybrid system is used in which outcome services component 140 determines only whether or not the progressive has been won by a player. The gaming system 180 is responsible for generating non-progressive ROG outcomes.

FIG. 3 shows a method for managing a progressive. Progressive management device 100 receives a wager placed by a player through an originating gaming system (step 300). In this case, the originating gaming system is gaming system 180. Progressive management device 100 analyzes the wager, including the amount of wager and the originating gaming system (step 310). Progressive management device 100 determines the amount of the wager to be applied to the progressive (step 320). Details of the determining performed in step 320



is provided below with respect to FIG. 4. Progressive management device 100 increments the progressive based on the analysis at step 320 (step 330).

5 An ROG pull is executed at step 340. The ROG pull can take several different forms or a combination of forms. For example, in one implementation the ROG is contained within a gaming system 180 (FIG. 1) such as a slot machine or online casino game. If the ROG results in a losing outcome, the outcome is displayed to the user through user interface 190 (step 350) and progressive management device 100 transmits updated progressive information to users (step 360). If the ROG results in a winning outcome, the outcome is displayed to the user through a user interface 190 (step 370), progressive management device 100 is notified, which then suspends the progressive and performs an audit on the winning transaction or transactions (step 380). 10

In another implementation, the ROG is contained within a gaming server 170, which is responsible for the ROG operations of the gaming systems 180 managed by gaming server 170. Gaming server 170 executes the ROG pull at step 340 and can transmit the result to the gaming system 180 through an appropriate interface. The gaming system can include game logic for mapping the ROG result to a game outcome. That is, the gaming system can determine the game outcome based on the received ROG result. Alternatively, gaming server can include game logic, in which case, the gaming server can determine the game outcome and send the determined game outcome to the game system. If the ROG results in a winning outcome, progressive management device 100 is notified, which then suspends the progressive and performs an audit on the winning transaction or transactions (step 380). If the ROG results in a losing outcome, progressive management device 100 can then transmit updated progressive information to users (step 360). 15 20

A further implementation places the ROG in a third party device such as outcome services component 140 within progressive management device 100. Outcome services component 140 can generate ROG results, at step 340, for a progressive determination as well as for individual gaming servers or gaming systems or both. Outcome services component 140 executes a ROG based on the odds of winning for the originating gaming system as determined by analysis engine 120 (step 340). The outcome services component 140 can then transmit the result of the ROG to a gaming server 170 or a gaming system 180, depending on which is designed to manage game outcomes, which then displays the outcome 25 30

to a user through a user interface 190. If the ROG results in a winning outcome, progressive management device 100 is notified, which then suspends the progressive and performs an audit on the winning transaction or transactions (step 380). If the ROG results in a losing outcome, progressive management device 100 can then transmit updated progressive information to users (step 360).

Alternatively, in the hybrid system discussed above, if the result does not produce an outcome indicating a progressive win, progressive management device 100 transmits the ROG result to the originating gaming system (step 350). The originating gaming system performs a normal ROG operation and displays (for example, through user interface 190) the ultimate outcome, while filtering out any outcome indicating that the user wins the progressive.

Progressive management device 100 transmits updated progressive data to all progressive users through user interfaces 190 (step 360). If there is a winning outcome, progressive management device 100 transmits the result to the users gaming system 180 (step 370). The user interface 190 then displays the winning outcome to the user. Progressive management device places a hold on other gaming systems on the progressive so an audit can be performed and the progressive reset before allowing play to continue (step 380).

In one implementation, when a player wins a progressive, the progressive wagers of other players and other propositions that are in progress can continue but no new proposition can be started. If another user also wins the progressive within an administratively set time period, rules for simultaneous jackpots can be applied. For example, a time limit between simultaneous wins can be defined within tenths of a second. The time of a transaction can be determined by a result generation time of a random number generator. If a progressive win is false, the games can be re-enabled and the users can then continue from the progressive amount at the time of the false win.

Upon a winning outcome, progressive management device 100 can halt the progressive and initiate a series of programmatic and non-programmatic functions. For example, the progressive management device can notify progressive management personnel that a potential award has been claimed as well as perform an award audit that can include retrieving metrics pertaining to the progressive usage, performance, and system integrity. For example, a transaction history of the progressive can be verified. The transaction history

can include transaction times, wager amounts, amounts paid, user decisions, and game outcomes. Further, all game play on the progressive is suspended and in one implementation users receive a message through user interface 190 that a progressive has been won and that a new progressive will begin shortly. The winning user can be notified that the transaction is being verified and that they will be contacted shortly by customer service. The operator of the progressive management device can be responsible for paying out a progressive win while the casino, through which the user won, can record a zero payout win. Thus, under this system, the progressive management operators are liable for the progressive and not the participating casinos. Once a winner has been determined, progressive management device 100 can, in one implementation, reset the progressive to a zero amount, or some other baseline amount, and then continue a same progressive with the same participating gaming systems. In an alternative implementation, progressive management device 100 can initiate a new progressive as described below with respect to FIG. 4.

FIG. 4 shows a method 400 for including gaming systems with different progressive payout parameters into a progressive. Referring now to FIG. 4 and FIG. 1, a system performing method 400 initiates a new progressive (step 410). The system can include, for example, progressive management device 100 (FIG. 1). In one implementation, progressive management device 100 selects parameters for the progressive. The parameters selected by progressive management device 100 can be consistent with applicable statutes and gaming regulations and can be used to harmonize games with different progressive payout parameters as discussed in detail below. Progressive management device 100 can also initiate one or more transmissions to authorized client systems advertising the availability of the progressive. In another implementation, progressive management device 100 contacts existing and potential clients soliciting participation in the progressive.

The system receives requests from one or more gaming systems to participate in the progressive (step 420). The request can be received by progressive management device 100 from gaming servers 170 through network 160 and optionally gateway 150. The request can include a request for participation of gaming server managed gaming systems in the progressive. The request can include information describing characteristics of a gaming system seeking participation, including and not limited to the gaming system's progressive payout parameters.

The system registers gaming systems for participation in the progressive (step 430). This is where a casino operator specifies or activates a new game to link to a progressive award. Registration can include verifying the source of the request to ensure that it is actually from the addressee and that the gaming server is authorized to participate in the progressive.

5       The system analyzes the characteristics of each gaming system seeking participation (step 440). Information about the gaming systems and the gaming server can be stored in memory for administrative uses such as billing client entities for progressive access. The information received regarding the gaming systems are analyzed. The analysis can include verifying the progressive payout parameters of the gaming system to ensure that it is fair and  
10       compatible with the progressive. Fairness can be and is usually defined by regulations. In general, fairness requires that the same stake affords the same chance of winning. Analysis of the progressive payout parameters also includes assessing the game odds, the wager amounts required to participate in the progressive, and the currency type being used. In one implementation, gaming systems using different currency types require a conversion. Sums  
15       can be converted into a standard currency type through conversions using real-time exchange rates. This allows for a standardized progressive award value regardless of the currency type used by the individual gaming systems. Additionally, the progressive value can be converted into the currency type consistent with each gaming system before being transmitted to the respective user interfaces.

20       For example, a progressive management device 100 located in Great Britain can use progressive payout parameters based on the Pounds Sterling currency. However, gaming systems located in other European countries can use progressive payout parameters based on the Euro currency. A wager received in Euro format can be converted Pounds Sterling for use in accumulating the progressive. Likewise, the progressive total in Pounds Sterling can  
25       be converted to Euro before transmission to gaming systems based on the Euro progressive payout parameters. The conversions can be completed in real-time, for example, by currency converter 125 (FIG. 1) in order to maintain accuracy of the progressive value. Following analysis of each game system and progressive payout parameters, progressive management device 100 determines whether or not to include that game system into the progressive.  
30       Some or all of the analysis performed in step 440 can be performed in registration step 430.

A similar process can occur when linking games which have different wagering requirements. For example, one game which requires 3 quarters as a qualifying wager and another game which requires 2 dollars as a qualifying wager. Unlike games with different currencies, different wagering requirements within the same currency is a static ratio.

5 However, whether game wagering differs due to currency or to actual wager thresholds, an integrator, for example, integrator component 135 (FIG. 2), still needs to be able to rectify the different wager amounts as is described later.

The system includes the gaming systems into the new progressive, where the progressive incorporates gaming systems having different progressive payout parameters (step 450). When adding gaming systems having different progressive payout parameters to  
10 a progressive, adjustment of the individual gaming system progressive payout parameters may be required to produce a viable game. Adjustments can be made based on the wager requirements, the odds of winning, or the amount of the wager that is credited to the progressive.

15 When including more than one gaming system into a single progressive, progressive management device 100 can modify the percentage amount of the wager on each gaming system that is applied towards the progressive award. For example, in one implementation, analysis device 120 (FIG. 2) examines the progressive payout parameters associated with an incoming wager. Once the analysis has been performed, a progressive payout parameters  
20 integrator 135 can be used to ensure that progressive engine 130 is incremented by the correct amount from each progressive wager. The percentage of wager information is stored in database 145 for use with subsequent wagers from the same gaming system 180 (FIG. 1). The percentage amount of the wager is selected so that for each gaming system the product of the wager required to be eligible for the progressive, the percent of that wager applied to  
25 the progressive, and the probability of winning the progressive, is identical for each gaming system linked to the progressive regardless of the progressive payout parameters of the individual gaming system.

One way of producing a viable progressive that includes more than one gaming system is to set the odds of winning the progressive proportionally to the wager size. For  
30 example, if gaming system A is a slot game having progressive payout parameters that calls for a one-in-ten million chance of winning the progressive when the qualifying wager value

of two dollars is bet, and if game B is also linked to the progressive but its progressive payout parameters calls for a maximum wager of fifty cents, then the odds of winning the progressive award in gaming system B can be set to be equal to one-quarter the odds of gaming system A, or one-in-forty million. Alternatively, the odds of game A can be altered instead, or both can be altered to match the progressive payout parameters of the progressive. In one implementation, progressive management device 100 establishes progressive payout parameters for the progressive during initiation 400. In another implementation, the progressive management device 100 selects progressive payout parameters from one of the participating gaming systems to use as the progressive payout parameters for the progressive. This may be desirable in cases where several participating games use the same progressive payout parameters. For simplicity, the previous example assumes an implementation in which each set of progressive payout parameters designates the same percentage amount of wager applied towards the progressive.

While it is possible to change game odds in order to include different progressive payout parameters into the same progressive, in many cases the odds cannot be changed. For example, card games, such as Caribbean Stud Poker, have set odds defined by the configuration of playing cards in a deck and cannot be changed. Further, other games such as slot games can have odds that are defined by regulation or statute. Therefore, it is often necessary to modify the percentage of wager applied to the progressive instead. The modification of the percentage of wager amount applied to the progressive provides an alternate method for gaming systems having different progressive payout parameters to be included in the same progressive without altering the odds of any one game, or including games whose odds cannot be changed.

For example assume that there are two gaming systems to be included in the same progressive, gaming system A and gaming system B. Gaming system A is already part of the progressive and has a progressive payout parameters that includes a \$2 minimum wager amount to be eligible for a progressive and odds of a progressive outcome at one-in-50 million. Under the progressive, two percent of each wager from a user of gaming system A is applied to the progressive, or four cents. Thus, the percentage of wager applied is two percent. Gaming system B, to be included into the progressive, has a progressive payout parameters that also includes a \$2 minimum wager amount to be eligible for a progressive

but the odds of a progressive outcome are one-in-40-million. In order to include gaming system B into a fair progressive, the difference of odds between gaming system A and gaming system B must be taken into account. To compensate for the differing odds, the percentage of wager to be applied to the progressive from gaming system A is selected such that the product of the wager amount, game odds, and percentage of wager applied is identical in both gaming system A and B. That is:

$$\begin{array}{cc} \text{Gaming System A} & \text{Gaming System B} \\ (\$2) * (2 \text{ percent}) * (1/50 \text{ million}) & = (\$2) * (y \text{ percent}) * (1/40 \text{ million}). \end{array}$$

Solving for “y” the percentage of wager to be applied from gaming system B is 1.6 percent. Consequently, for each two dollar wager placed by a user on gaming system A, four cents will be added to the progressive amount. However, for each two dollar wager placed by a user on gaming system B, three point two cents will be added to the progressive amount.

The modification of the percentage of wager applied to the progressive allows gaming systems having different progressive payout parameters, including different odds of winning, to be included into the same progressive.

The modification of percentage of wager applied can be generalized to a situation in which at the creation of a progressive, the progressive parameters are determined including constant X by which the product of the wager, game odds, and percentage of wager applied for each gaming system is equal to X. Thus, for the previous example X is equal to  $8 \times 10^{-10}$ :

$$X = 8 \times 10^{-10} = (\$2) * (1/50 \text{ million}) * (2 \text{ percent}) = (\$2) * (1/40 \text{ million}) * (1.6 \text{ percent}).$$

By setting a constant parameter X at the initiation of a progressive, many different gaming systems having many different progressive payout parameters can be included in one progressive by modifying the percentage of wager applied to satisfy the parameter X. The amount of wager used in the preceding example (\$2) was chosen identical in each case to more easily illustrate the method for including gaming systems into the same progressive.

The wager can be any amount and each gaming system can have a different wager amount

without impacting the viability of the method. Regulations can play a key role in progressive payout parameters structure.

In general, progressive management device 100 is able to process progressive payout parameters information for a gaming system and, through analysis, determine what percentage of the wager to apply to the progressive total in order for the gaming system to be consistent with the progressive. This allows for participation of gaming systems having different progressive payout parameters in the same progressive.

In one implementation, as illustrated in FIG. 5, a system 500 is provided for managing a progressive game including a progressive management device 505 coupled to one or more gaming servers 170. The gaming servers include gaming systems 510 and 520 having different progressive payout parameters. The gaming servers are coupled to user interfaces 190. In this implementation, the progressive management device 505 is a local device coupled to the gaming server as a separate device connected via, for example, a local network. Progressive management device 505 can perform the same functions as progressive management device 100. In an alternative implementation, the progressive management functions are performed through a software program incorporated into the gaming server or a computer coupled to the gaming server.

System 500 allows for a secure in-house system for managing a progressive including gaming systems having different progressive payout parameters. One example of this implementation is a single casino system operating many different gaming systems. The single casino system can include a wide variety of gaming systems into a single progressive within the casino. Thus, all progressive slots in a casino could be part of the same progressive regardless of gaming system instead of having different progressives within the casino. This is equally applicable to an online casino or a land-based casino with computer operated gaming systems such as slots or video poker.

In another implementation, a system is provided for including gaming systems having the same progressive payout parameters and from different enterprises in a progressive. As shown in FIG 6, a system 600 includes a progressive management device 100 coupled through a network to two or more enterprises 610 and 620. Each enterprise contains one or more gaming servers 170. Within each gaming server 170 are one or more gaming systems having the same progressive payout parameters. The gaming servers 170 are coupled with



user interfaces 190. An enterprise can be any legal entity including a company, a corporation, or a partnership. Using system 600, gaming systems from one corporation's casinos can be included with gaming systems from another corporation's casinos in a single progressive. This leads to higher progressive values, which draws players to the progressive game. In an alternative implementation, the gaming systems have two or more different progressive payout parameters.

The invention can be implemented in digital electronic circuitry, or in computer hardware, firmware, software, or in combinations of these. Apparatus of the invention can be implemented in a computer program product tangible embodied in a machine-readable storage device for execution by a programmable processor; and method steps in the invention can be performed by a programmable processor executing a program of instructions to perform functions of the invention by operating on input data and generating output. The invention can be implemented advantageously in one or more computer programs that are executable on a programmable system including at least one programmable processor couple to receive data and instructions for, and to transmit data and instructions to, a data storage system, at least one input device, and at least one output device. Each computer program can be implemented in a high-level procedural or object-oriented programming language, or in assembly or machine language if desired; and in any case, the language can be a compiled or interpreted language. Suitable processors include, by way of example, both general and special purpose microprocessors. Generally, a processor will receive instructions and data from a read-only memory and/or a random access memory. Generally, a computer will include one or more mass storage devices for storing data files; such devices include magnetic disks, such as internal hard disks and removable disks; magneto-optical disks; and optical disks. Storage devices suitable for tangibly embodying computer program instructions and data include all forms of non-volatile memory, including by way of example semiconductor memory devices, such as EPROM, EEPROM, and flash memory devices; magnetic disks such as internal hard disks and removable disks; magneto-optical disks; and optical disks. Any of the foregoing can be supplemented by, or incorporated in, ASICs (application-specific integrated circuits).

To provide for interaction with a user, the invention can be implemented on a computer having a display device, e.g., a CRT (cathode ray tube) or LCD (liquid crystal

display) monitor, for displaying information to the user and a keyboard and a pointing device, e.g., a mouse or a trackball, by which the user can provide input to the computer. Other kinds of devices can be used to provide for interaction with a user as well; for example, feedback provided to the user can be any form of sensory feedback, e.g., visual feedback, auditory feedback, or tactile feedback; and input from the user can be received in any form, including acoustic, speech, or tactile input.

The invention can be implemented in a computing system that includes a back-end component, e.g., as a data server, or that includes a middleware component, e.g., an application server, or that includes a front-end component, e.g., a client computer having a graphical user interface or a Web browser through which a user can interact with an implementation of the invention, or any combination of such back-end, middleware, or front-end components. The components of the system can be interconnected by any form or medium of digital data communication, e.g., a communication network. Examples of communication networks include a local area network ("LAN") and a wide area network ("WAN"), e.g., the Internet.

The computing system can include clients and servers. A client and server are generally remote from each other and typically interact through a communication network. The relationship of client and server arises by virtue of computer programs running on the respective computers and having a client-server relationship to each other.

A number of implementations have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. For example, the steps of the invention can be performed in a different order and still achieve desirable results. As an example, the Random Outcome Generator used by one or more game systems may be implemented separately within each game system, or may be shared across games systems or could reside within the progressive server itself. As another example, multiple game systems could represent different online casino identifies or could represent the same casino but serving different geographic localities or could represent the same casino but for different communities, such as a standard player community and a high-roller VIP player community.

What is claimed is: